

**Does Traditional Chinese Medicine improve
semen morphology, motility and count? A
pragmatic randomised clinical trial**

Jann Judith Mehmet

**A thesis submitted as partial requirement for the degree of
Master of Science by Research**

Faculty of Science

University of Technology Sydney

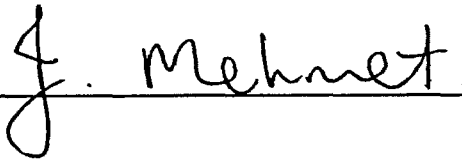
January 2006

CERTIFICATE OF AUTHORSHIP/ORIGINALITY

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signature of Candidate

A handwritten signature in black ink, reading "J. Mehmet.", is written over a horizontal line. The signature is cursive and fluid, with a large initial "J" and a period following the name.

Acknowledgements

My sincere thanks to:

The twenty eight participants who agreed to join the study and their partners whose enthusiasm and kind words were very encouraging. My principal supervisor, Chris Zaslawski, for his diplomatic disposition and enthusiastic encouragement and support. Damien Ryan my co-supervisor. Narelle Smith, for her guidance and help with statistical analysis. James Leong for his generous laboratory analysis of the participants' semen samples. Sun Ten, Health Worlds and the Shen Neng Pharmaceutical Company for donating herbal products and Tony from Helios Supply for the donation of acupuncture needles.

List of refereed papers, conference presentations and posters arising from the research

Refereed Conference papers

- Mehmet, J, Zaslowski, C, Leong, J. (2004) Does traditional Chinese medicine improve semen count, motility and morphology in sub fertile men? A pragmatic randomised clinical trial. *University of Technology Sydney, Postgraduate research Conference, November 2004.*

Conference presentations

- Mehmet, J, Zaslowski, C, Leong, J. (2004) Does traditional Chinese medicine improve semen count, motility and morphology in sub fertile men? A pragmatic randomised clinical trial. *Presented at the 6th Annual University Graduate School, Student Services Postgraduate Research Students' Conference, Sydney.*
- Mehmet, J, Zaslowski, C, Ryan, D, Leong, J. (2004) Does traditional Chinese medicine improve semen count, motility and morphology in sub fertile men? A pragmatic randomised clinical trial. *Presented at the WAFAS 6th World Conference on Acupuncture, Gold Coast.*
- Mehmet, J, Zaslowski, C. (2004) Does traditional Chinese medicine improve semen count, motility and morphology in sub fertile men? A pragmatic randomised clinical trial. *Presented at the 11th Annual RNSH Scientific Research Meeting, Sydney.*
- Mehmet, J, Zaslowski, C. (2005) Does traditional Chinese medicine improve semen count, motility and morphology in sub fertile men? A pragmatic randomised clinical trial. *Presented at the University of Technology, Sydney Health Research Forum, Sydney.*

Posters

- Mehmet, J, Zaslowski, C. (2004) Does traditional Chinese medicine improve semen count, motility and morphology in sub fertile men? A pragmatic randomised clinical trial. *Sponsored by the 2nd Australian Health and Medical Research Council Conference, Sydney Convention Centre, Sydney.*

Contents

Acknowledgements	ii
List of refereed papers, conference presentations and posters	iii
Contents	iv
Figures	viii
Tables	ix
Abstract	xi
Chapter I: Introduction	1
1.1 General background	1
1.1.1 Sub fertile trends	1
1.1.2 Spermatozoa abnormalities	1
1.1.3 Sub fertile versus infertile	2
1.1.4 Semen analysis	2
1.1.5 Causes of male sub fertility	2
1.1.6 Diagnosing the cause of male sub fertility: the issues	3
1.1.7 Issues related to the limited investigation into the causes of male infertility	3
1.1.8 Semen analysis: a 'blue print' of a man's health	4
1.1.9 Infertility in Chinese medicine	5
1.1.10 The weaknesses of current Chinese medicine research on male infertility and sub fertility	6
1.2 Significance of the study	7
1.2.1 The strengths of the Chinese medicine model: supporting the current study	7
1.3 Aim of the study	8
1.4 Format of the thesis	8
Chapter II: Background information that influenced the design of the study	10
2.1 Clarification of important definitions	10
2.1.1 Varicocele	10
2.1.2 The semen analysis form	11

2.1.3	Normal versus sub fertile semen parameters	12
2.1.4	Sub fertile parameters that influenced the selection criteria	12
2.1.5	The major issues of semen analysis	13
2.2	Chinese medicine and male infertility	15
2.2.1	The meridians	15
2.2.2	General investigation and diagnosis in CM	16
2.2.3	CM diagnosis and investigation of male sub fertility	17
2.2.4	CM diagnostic and treatment categories in male sub fertility	19
Chapter III: Literature review		20
3.1	Chinese medicine (CM) research on male sub fertility	20
3.1.1	Clinical trials using acupuncture	20
3.1.2	Cohort studies using Chinese herbal medicine	23
3.1.3	Cohort studies using acupuncture	25
3.1.4	Cohort study using acupuncture, Chinese herbal medicine and point injection therapy	26
Chapter IV: Method		27
4.1	Participants	27
4.1.1	Participants age	28
4.2	Ethics application	28
4.3	Recruitment	28
4.3.1	The recruitment method	28
4.3.2	Selection of participants to be randomised	39
4.4	Randomisation	30
4.4.1	Identification numbers and randomisation	30
4.4.2	Randomisation into the control group	31
4.4.3	Randomisation into the treatment group	31
4.5	The pragmatic treatment intervention	32
4.5.1	The acupuncture intervention	32
4.5.2	Chinese medicine herbal intervention	33
4.5.3	Chinese medicine herbal formulas	34
4.6	Measuring outcomes	36
4.6.1	Analysing semen samples	37

4.6.2	Statistical analysis	37
Chapter V: Results		38
5.1	Data analysis on the effect of Chinese Medicine (CM) on semen morphology, motility and count.	38
5.1.1	Morphology	38
5.1.2	Motility	40
5.1.3	Count	41
5.2	Case history results	44
5.2.1	Medical history	44
5.2.2	History of chronic infection and tiredness	45
5.2.3	History of significant exposure to environmental or work place contaminants	46
5.2.4	History of testicular symptoms	47
5.2.5	Chronic general symptoms important in CM diagnosis	47
5.4	Summary of responses from the feedback form	48
5.4.1	Recruitment	48
5.4.2	Q 1a: Did the web site or initial communication and information via emails assist you in feeling more comfortable about making enquiries about the trial?	
	Q1b: Was the information on the website or communication via emails helpful in making you decide to join the trial?	48
5.4.3	Q 2: Did you find the trial well organised?	49
5.4.4	Q 3: Did you have any apprehensions about working with a female practitioner?	
	Q 4: Do you think a male practitioner would be more suitable?	49
5.4.5	Q 5: Have you received acupuncture before the trial?	
	Q 6: Have you received Chinese herbal medicine before the trial?	50
5.4.6	Q 7: Would you consider having acupuncture or Chinese herbal medicine treatments in the future?	50
5.4.7	Q 8: Rate the benefits to your health as a result of your participation in the trial.	51

5.4.8 Q 9: Are you glad that you participated in the trial?	51
Chapter VI: Discussion	53
6.1 The results of the randomised clinical trial	53
6.2 Discussion on the important findings observed during the study	56
6.2.1 Varicocele	56
6.2.2 Exposure to environmental contaminants	58
6.2.3 Low grade chronic infection and reduced immunity	60
6.2.4 Chinese medicine discussion on kidney yin and yang vacuity leading to male sub fertility	62
6.2.5 Referral practices	62
6.2.6 Genetic versus environmental causes	64
Chapter VII: Conclusion	65
7.1 Future directions	65
Appendices	66
Appendix 1: Glossary	66
Appendix 2: The semen analysis form	67
Appendix 3: Media release	68
Appendix 4: Web page advertising the clinical trial	71
Appendix 5: Consent form	72
Appendix 6: Participant information form	75
Appendix 7: Recruitment brochure	83
Appendix 8: Letter to urologists	84
Appendix 9: Medical history questionnaire	85
Appendix 10: Participant feedback form	92
Appendix 11: Treatment given to the experimental group	94
References	106

Figures

Figure 4.1: Flow chart for participant allocation	28
Figure 5.1: Dot plots of change in morphology (morphology post minus morphology pre)	41
Figure 5.2: Dot plots of change in motility (motility post minus motility pre)	42
Figure 5.3: Dot plots of change in count (count post minus count pre)	43

Tables

Table 4.1 Mean age of the randomised group	29
Table 5.1 Baseline mean of morphology, motility, count and age of the two groups	39
Table 5.2 Mean morphology scores before and after the eight week treatment and control period	40
Table 5.3 Mean motility scores before and after the eight week treatment and control period	42
Table 5.4 Mean sperm count in the treatment and control groups before and after the eight week treatment and control period	43
Table 5.5 The distribution of subjects who received tonics	44
Table 5.6 Participants who received herbal remedies for chronic infection during the study	45
Table 5.7 The medical history of participants in the study	46
Table 5.8 The incidence of general chronic infection; chronic hay fever and sinusitis; and chronic tiredness	47
Table 5.9 The incidence of significant and potentially detrimental exposure to environmental and work place contaminants and liver tenderness on palpation during CM diagnosis	47
Table 5.10 Testicular medical history	48
Table 5.11 The incidence of chronic general health complaints	49

Table 5.12 Participants' response concerning the helpfulness of email and web site communication in supporting their decision to join the study	50
Table 5.13 Participants' response concerning the organisation of the trial	50
Table 5.14 Participants' response concerning the suitability of a female practitioner in treating sub fertile men compared to a male practitioner	51
Table 5.15 Participants who received acupuncture and Chinese herbal medicine before the trial	51
Table 5.16 Participants' response considering acupuncture and Chinese herbal medicine treatment in the future	52
Table 5.17 Participants' response considering the benefits of participating in the trial	52
Table 5.18 Participants appraising involvement in the trial by answering the question, are you glad you participated in the trial?	53

Abstract

Background

The treatment of male infertility in Chinese medicine is discussed in several cohort studies and case histories recorded and published in Chinese medicine (CM) and biomedicine journals. These papers claim fair to excellent results in improving semen parameters and pregnancy rates. Three clinical trials conducted by Pei et al (2005), Siterman et al (2000) and Siterman et al (1997) also found evidence of a statistically significant increase in semen parameters within the treatment group after acupuncture.

Objective

To compare the effectiveness of acupuncture and Chinese herbal medicine treatment on the semen parameters, count, motility and morphology to no treatment at all.

Design

A pragmatic randomised controlled study.

Setting

Participants received Chinese medicine treatment at a private clinic, the Rozelle Acupuncture and Chinese Medicine Centre, while semen samples were analysed in the laboratory of Sussex Fertility Services.

Patients

Twenty-eight sub fertile men agreed to participate in the study. Of this cohort, 15 participants matched selection criteria and were randomised into the control and treatment groups.

In addition, 13 sub fertile men, who did not meet the selection criteria for the randomised clinical trial, completed a medical history questionnaire and were examined using Chinese medicine diagnosis. In total, 28 sub fertile men were examined and completed the medical history questionnaire.

Measurement

A semen analysis by 'Strict criteria' measured the sperm morphology, motility and count of the treatment and control groups before and after the eight week treatment or control period respectively. The scientist analysing the semen samples was blind to the subjects' status.

Treatment

The acupuncture treatment and Chinese herbal formulas selected were based on Chinese medicine pattern differentiation, individually diagnosed for each participant.

The treatment group (n=8) were provided eight weeks of acupuncture (one treatment per week) and Chinese herbal medicine, while the control group (n=7) received no treatment.

Results

Changes in semen parameters in the treatment and control groups before and after the treatment and control period were compared and analysed using Analysis of Variance (ANOVA), (SPSS).

Statistically significant increases were observed for morphology, $p < 0.04$ and motility, $p < 0.008$. No statistically significant increase was observed for sperm count $p < 0.13$, though a clinically significant improvement in count was observed for the five participants in the treatment group who received Chinese medicine formulas designed to supplement count. The mean increase in count for this group was 220 million sperm (range 63.6 to 826 million).

Fifty-eight percent of participants referred during the study for an ultrasound of the testes were found to have a varicocele, a major factor for male sub fertility.

Limitations

The microscope used to analyse the semen samples was a standard laboratory microscope for this procedure, however it was not able to observe sperm cell nucleus and DNA.

Conclusion

Despite the study having a small number of participants, some significant and encouraging findings towards improvement in sub fertile parameters were observed in the moderately sub fertile participants.